



US009332392B1

(12) **United States Patent**
Conway et al.

(10) **Patent No.:** **US 9,332,392 B1**
(45) **Date of Patent:** **May 3, 2016**

(54) **REMOTELY ACTIVATING A COMBINATION
OF MOBILE DEVICE FUNCTIONS**

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 807 days.

(21) Appl. No.: **13/493,555**

(22) Filed: **Jun. 11, 2012**

(51) **Int. Cl.**
H04W 4/02 (2009.01)

(52) **U.S. Cl.**
CPC **H04W 4/025** (2013.01)

(58) **Field of Classification Search**
CPC H04W 4/02; H04W 4/025; H04W 64/00
USPC 455/418–420, 550.1, 556.2, 90.1,
455/414.1, 456.1–456.6

See application file for complete search history.

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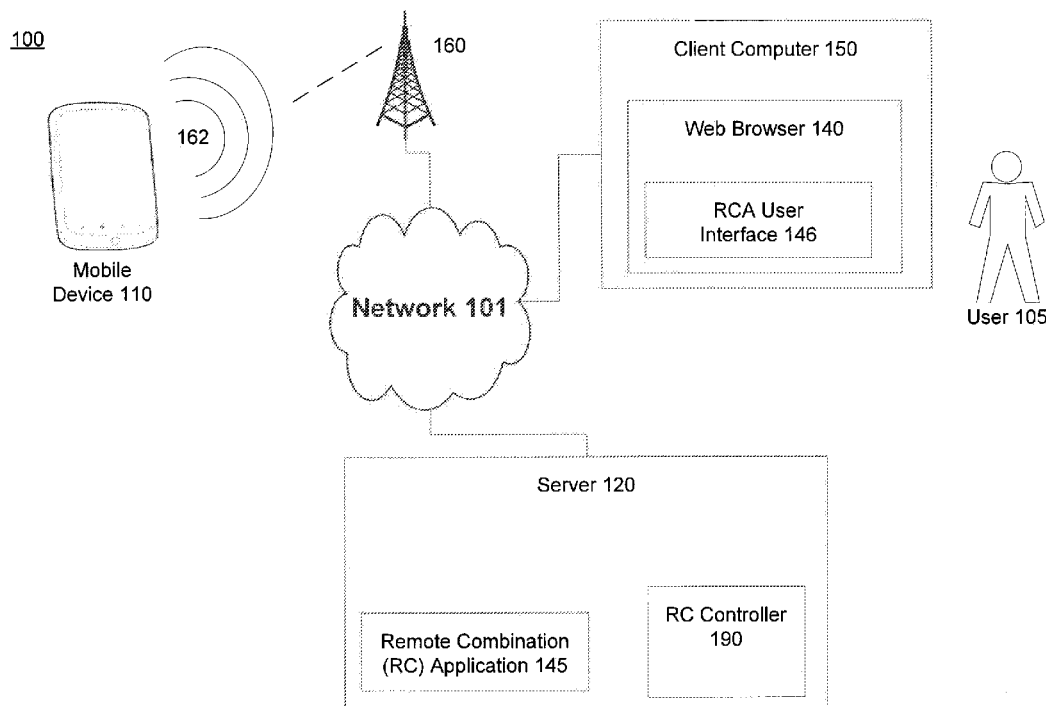
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(57) **ABSTRACT**

A method of remotely activating a combination of mobile device functions using a network application includes receiving, using the network application at a server, a client command from a client computer and sending an instruction to activate a combination of mobile device functions on the mobile device based on the client command. The method further includes receiving, at the server, information from the mobile device based on the activated combination of mobile device functions and sending client information to the client computer based on the received information from the mobile device.

8 Claims, 12 Drawing Sheets



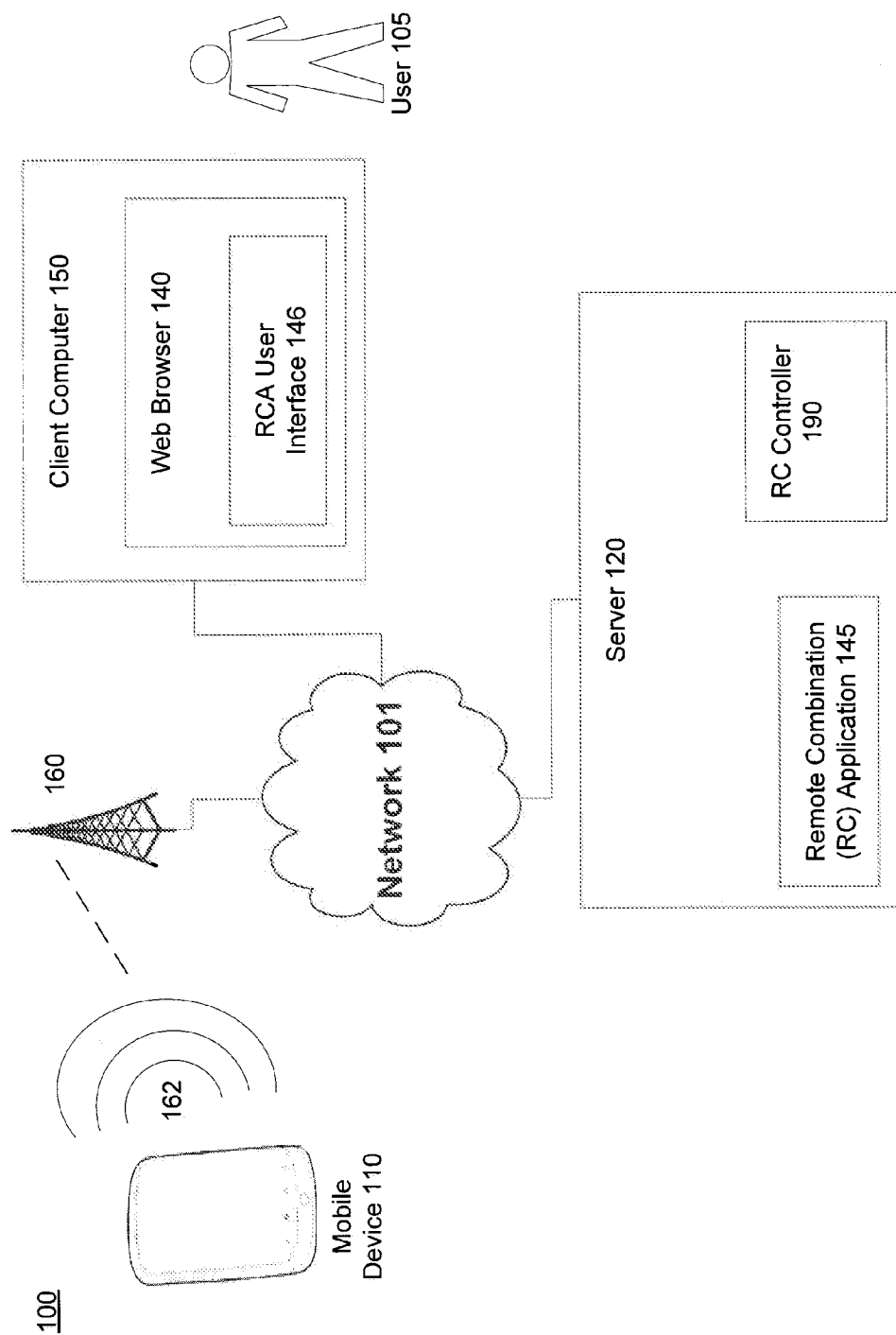
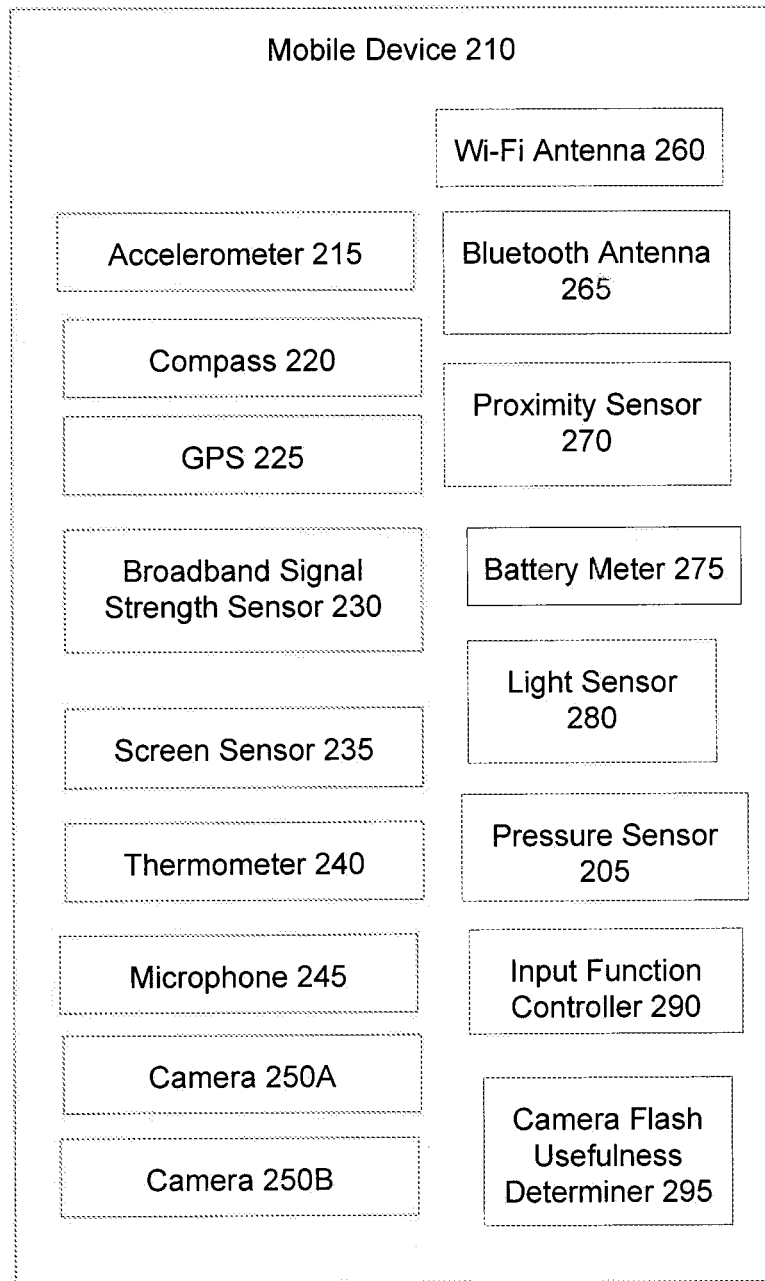
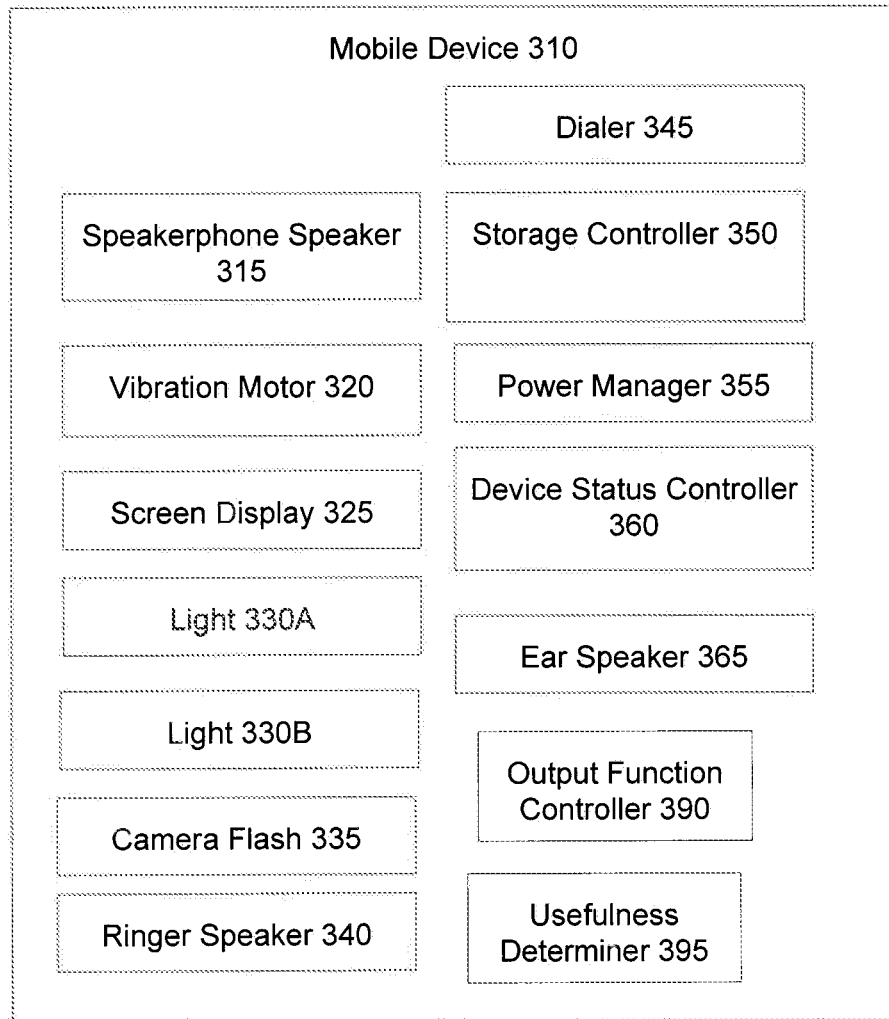
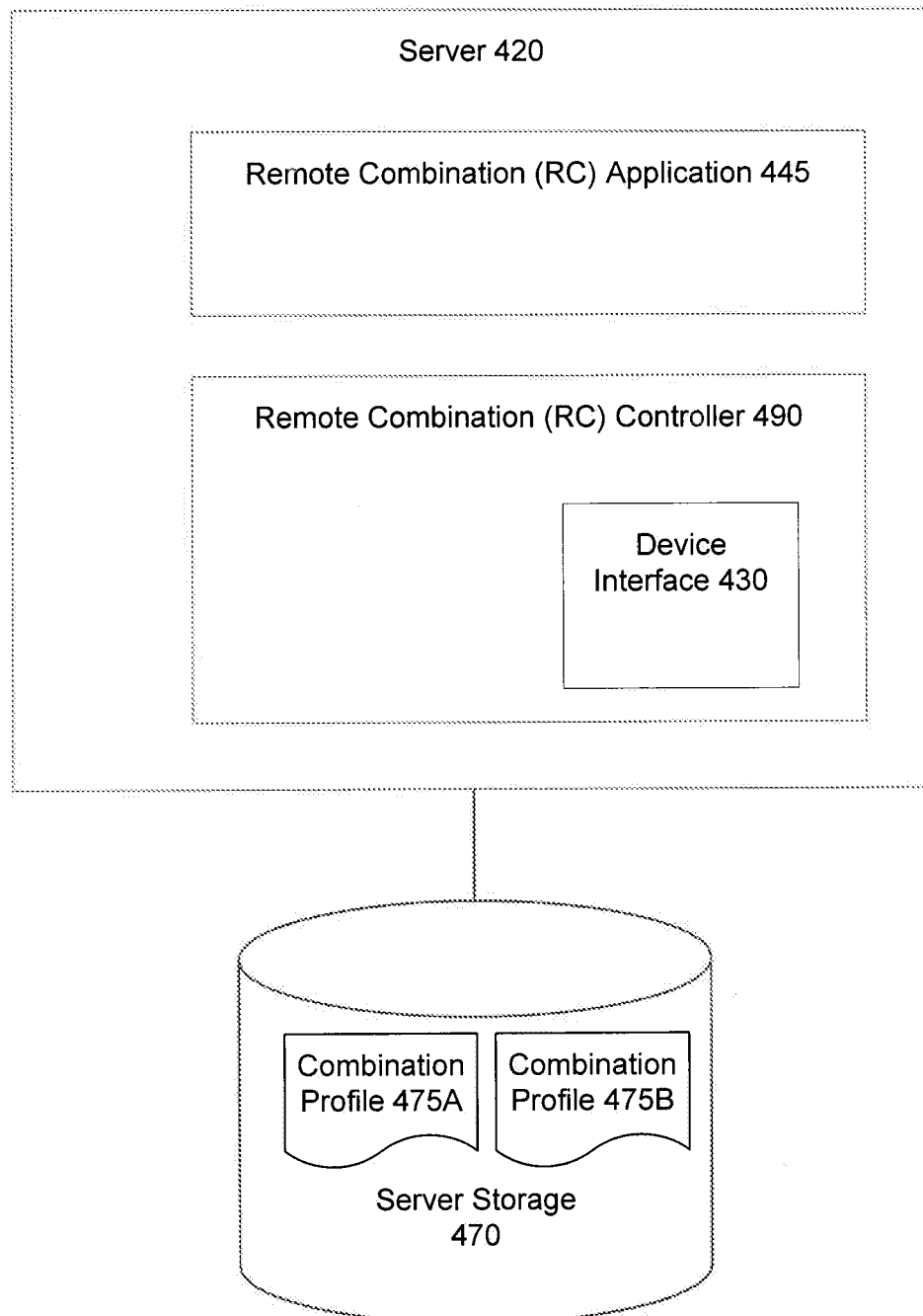


FIG. 1

**FIG. 2**

**FIG. 3**

**FIG. 4**

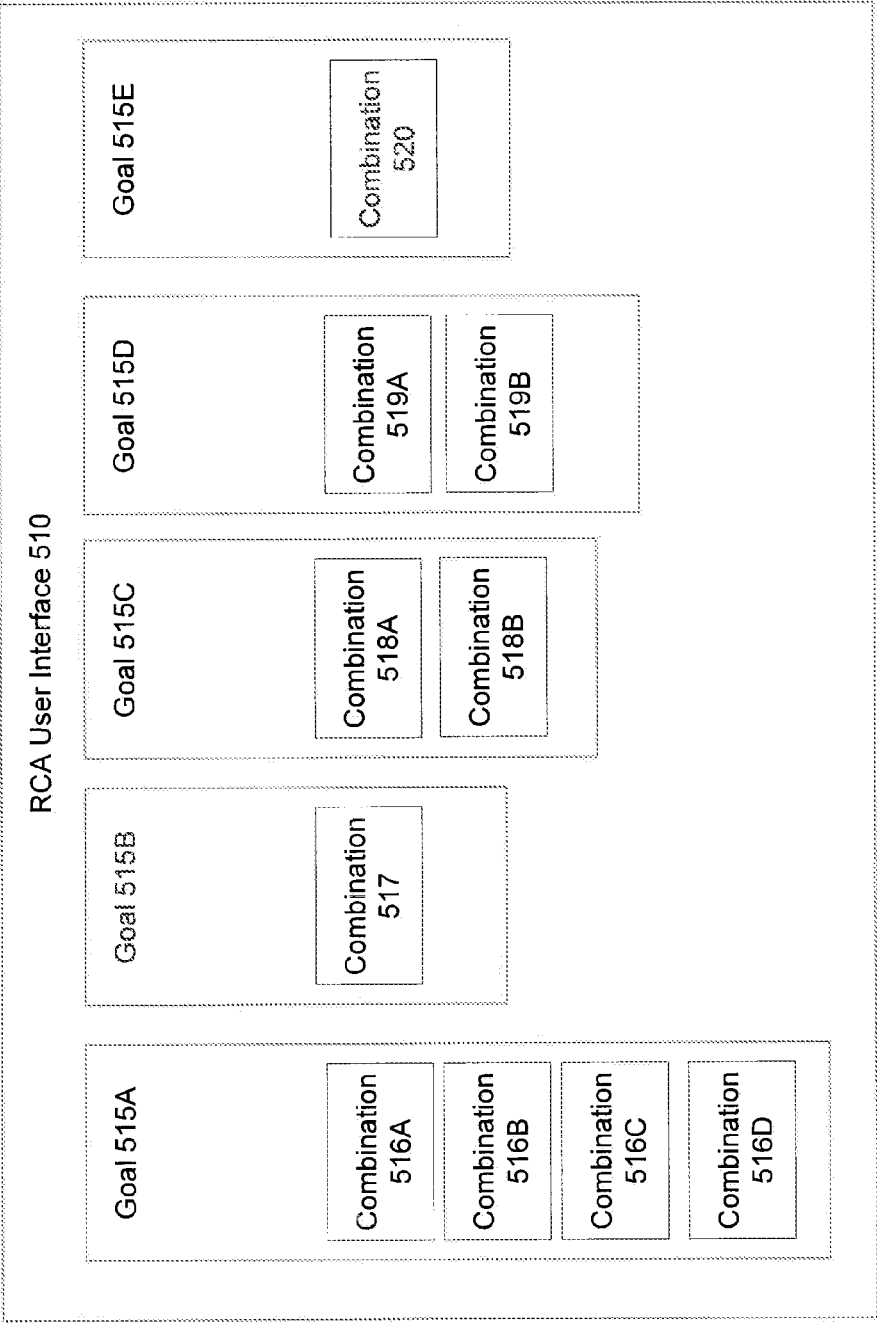


FIG. 5

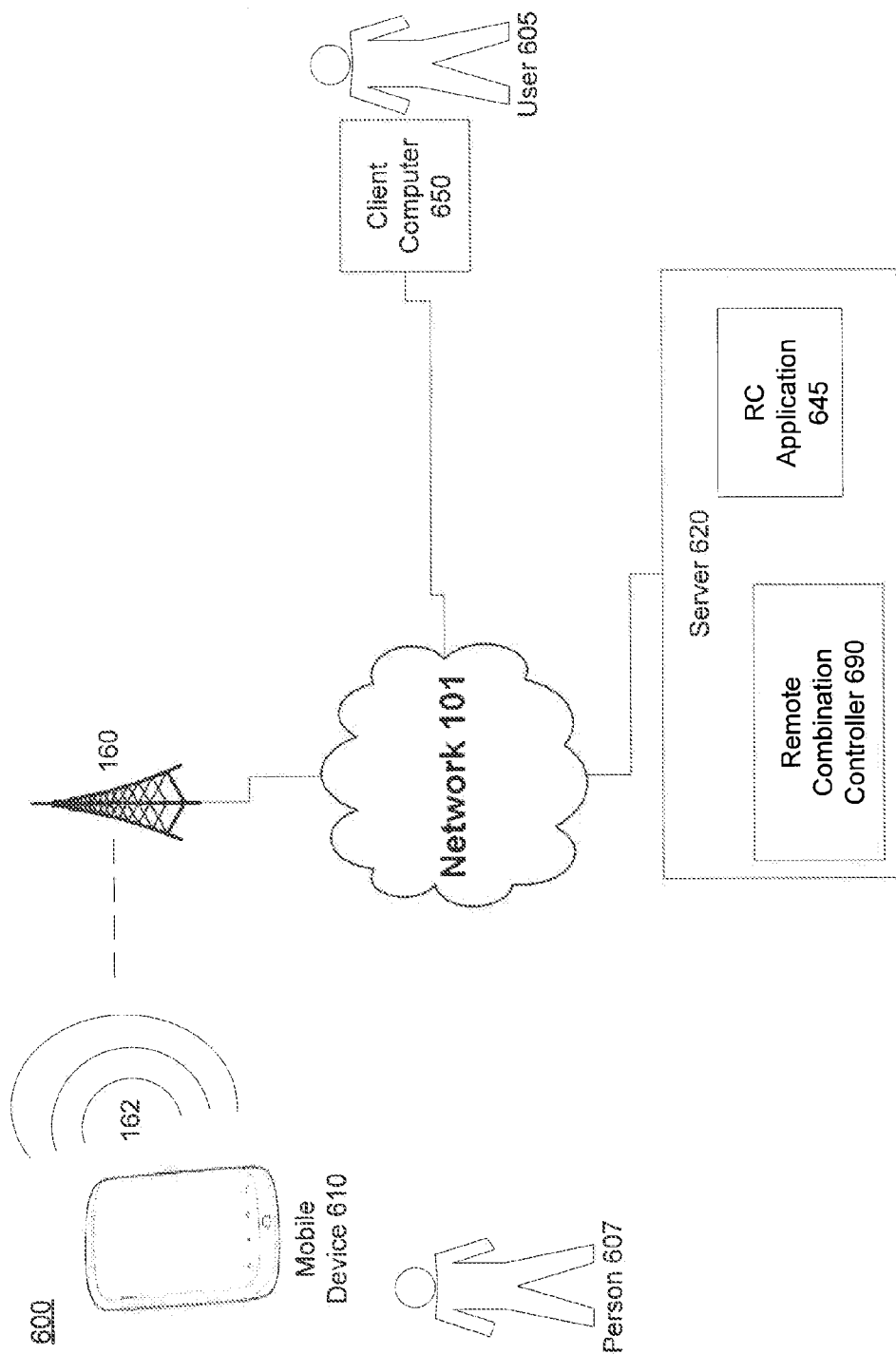


FIG. 6

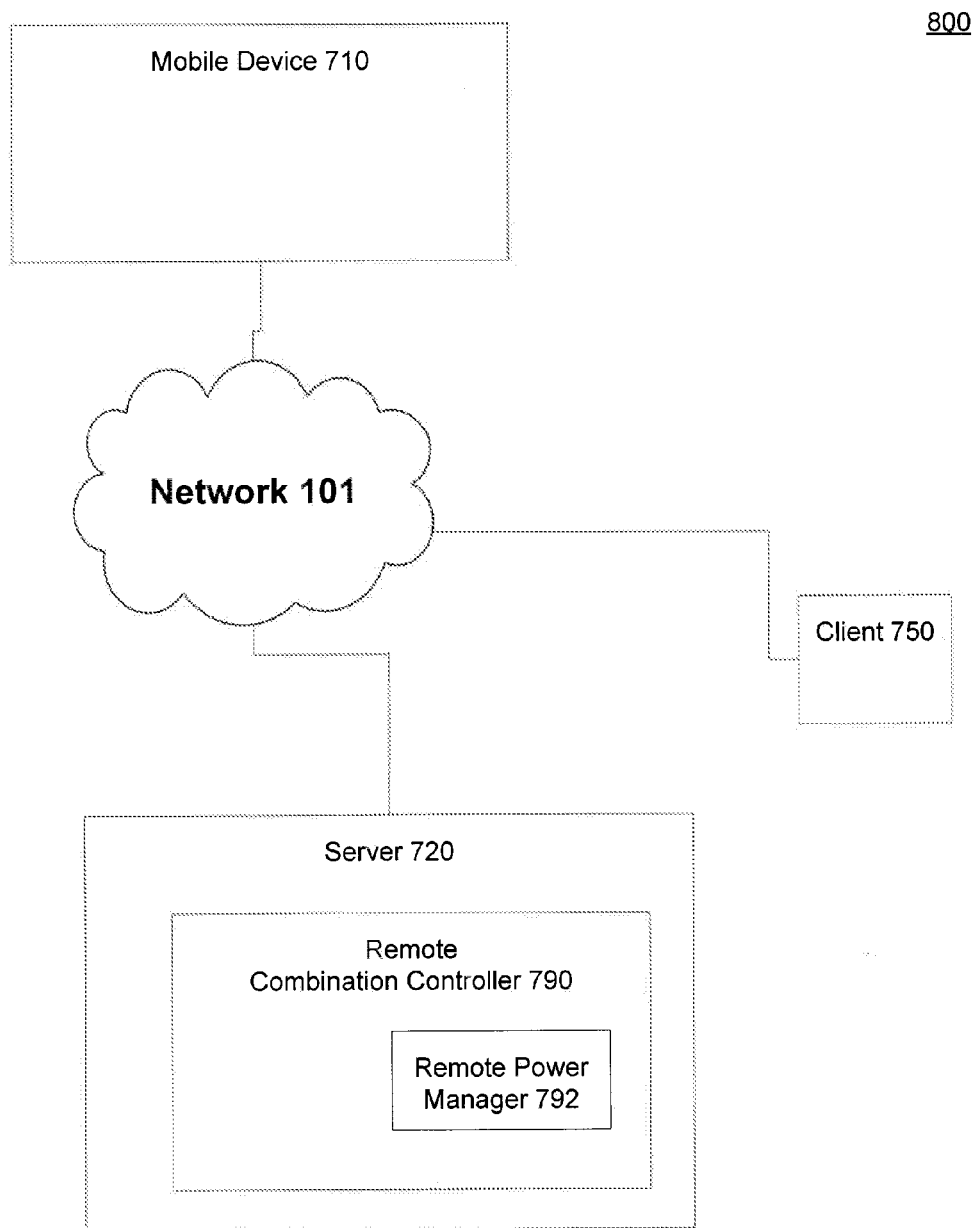


FIG. 7

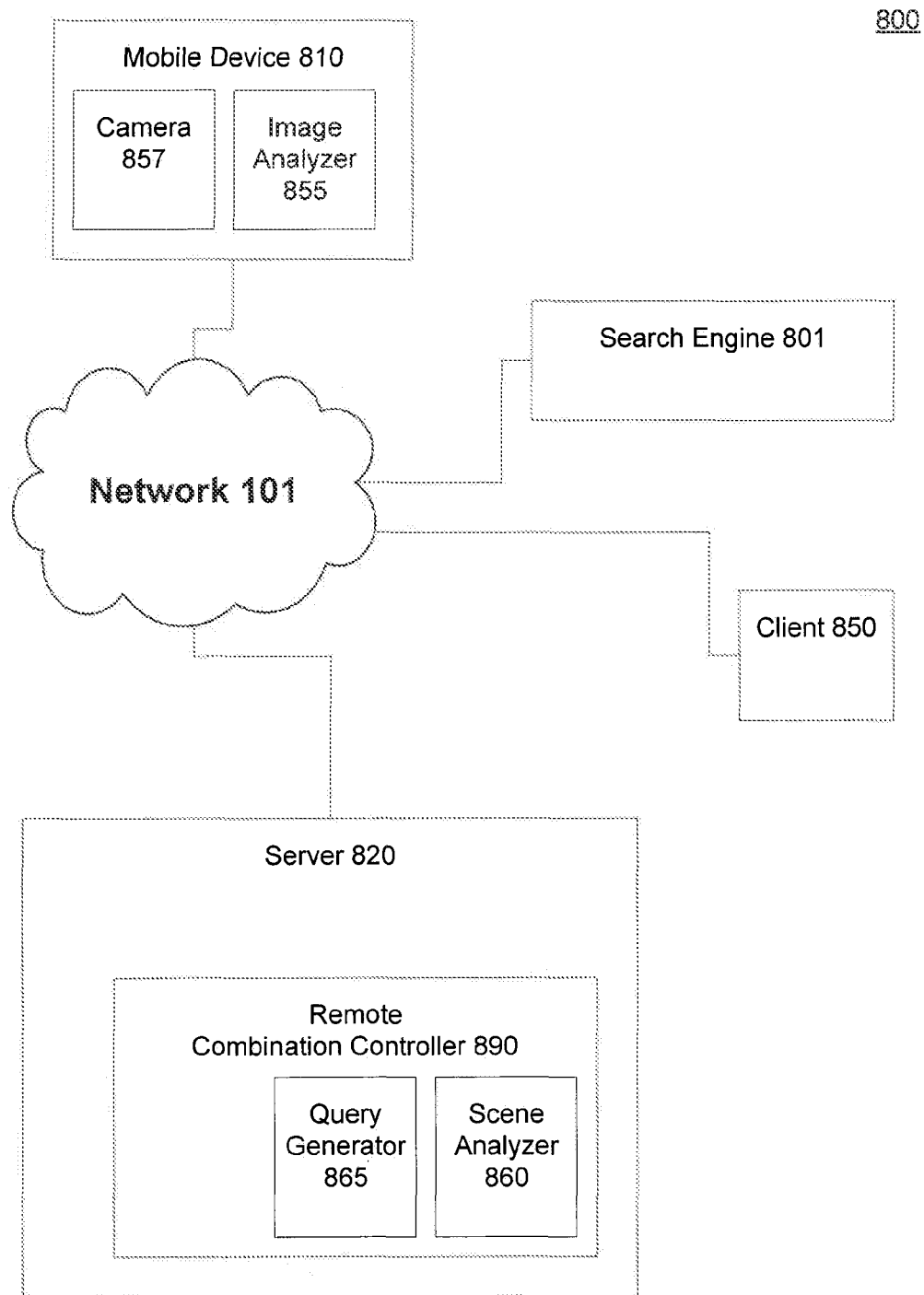


FIG. 8

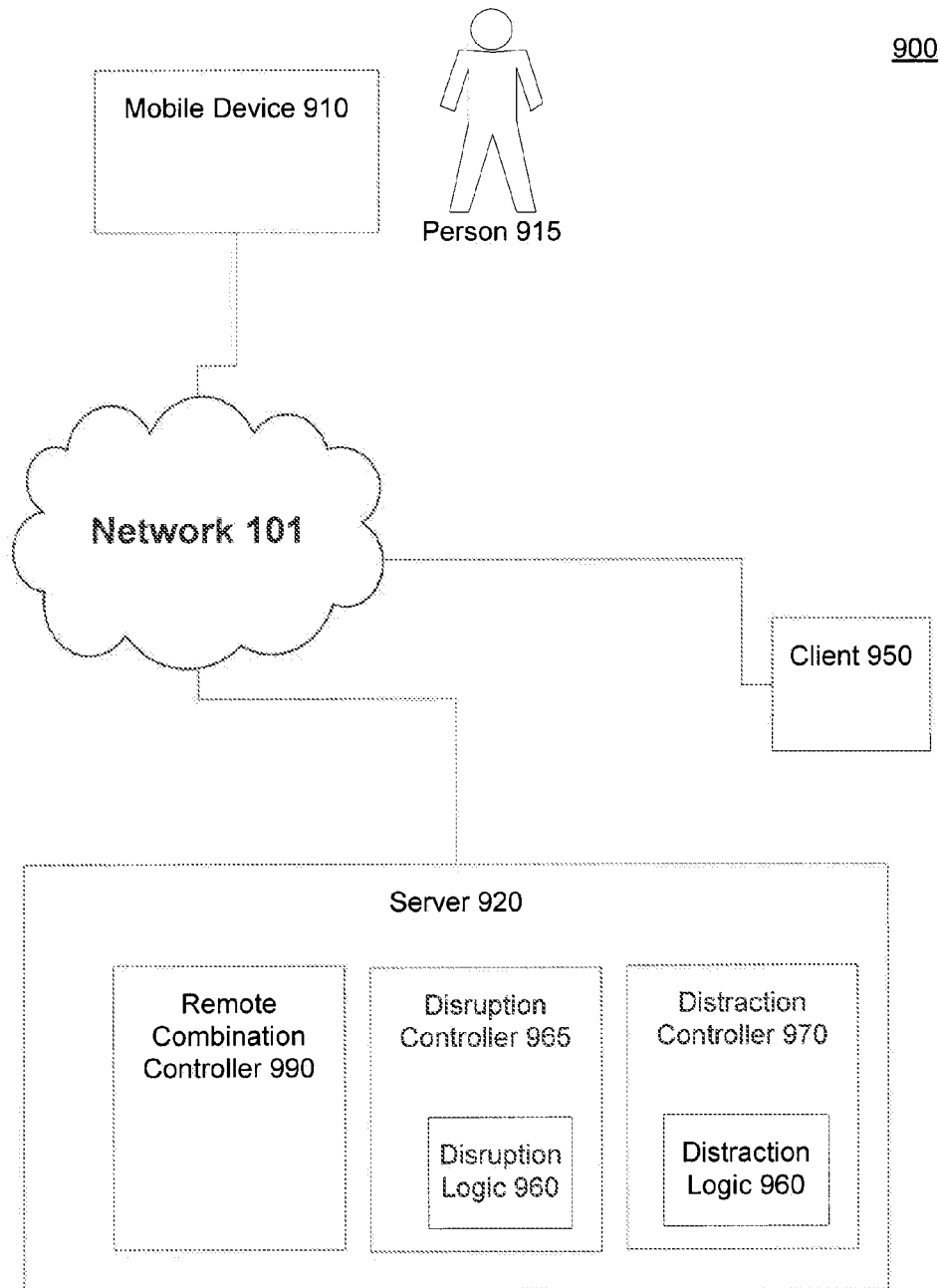


FIG. 9

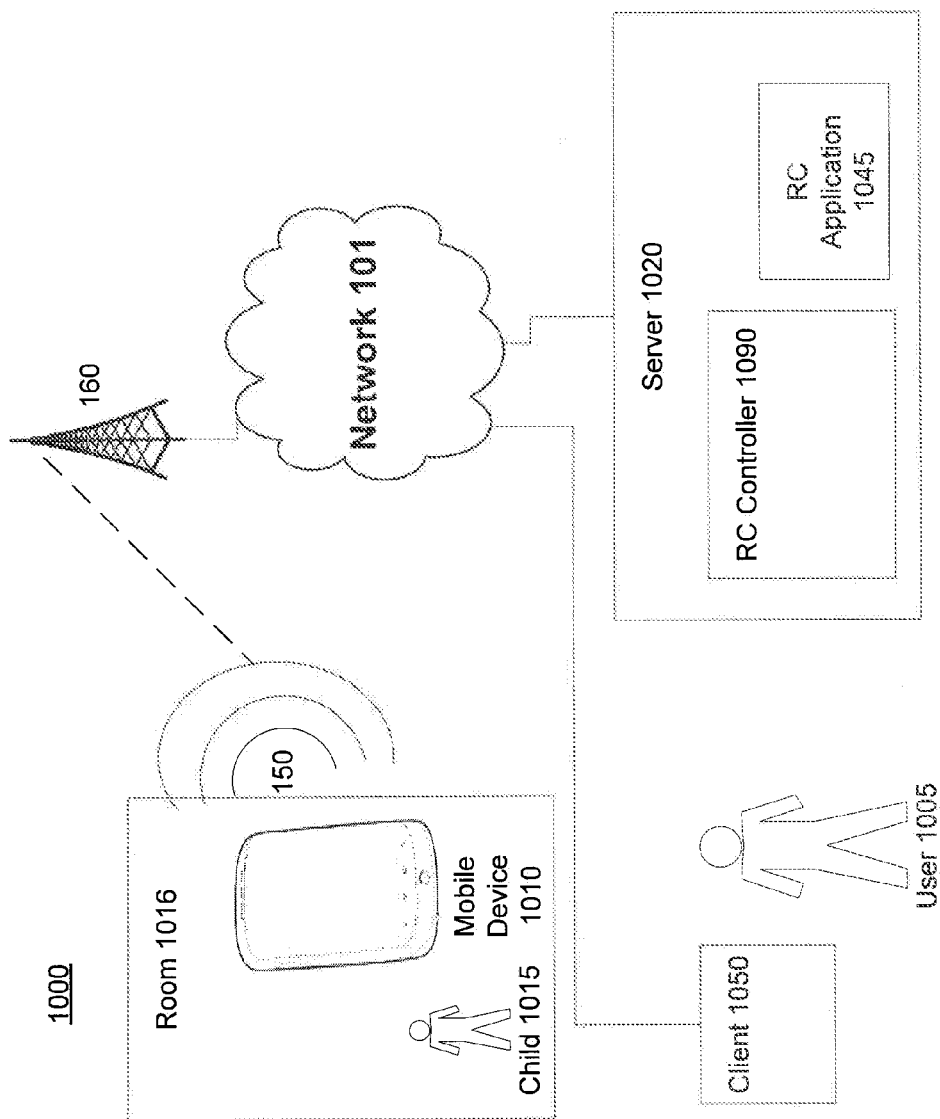
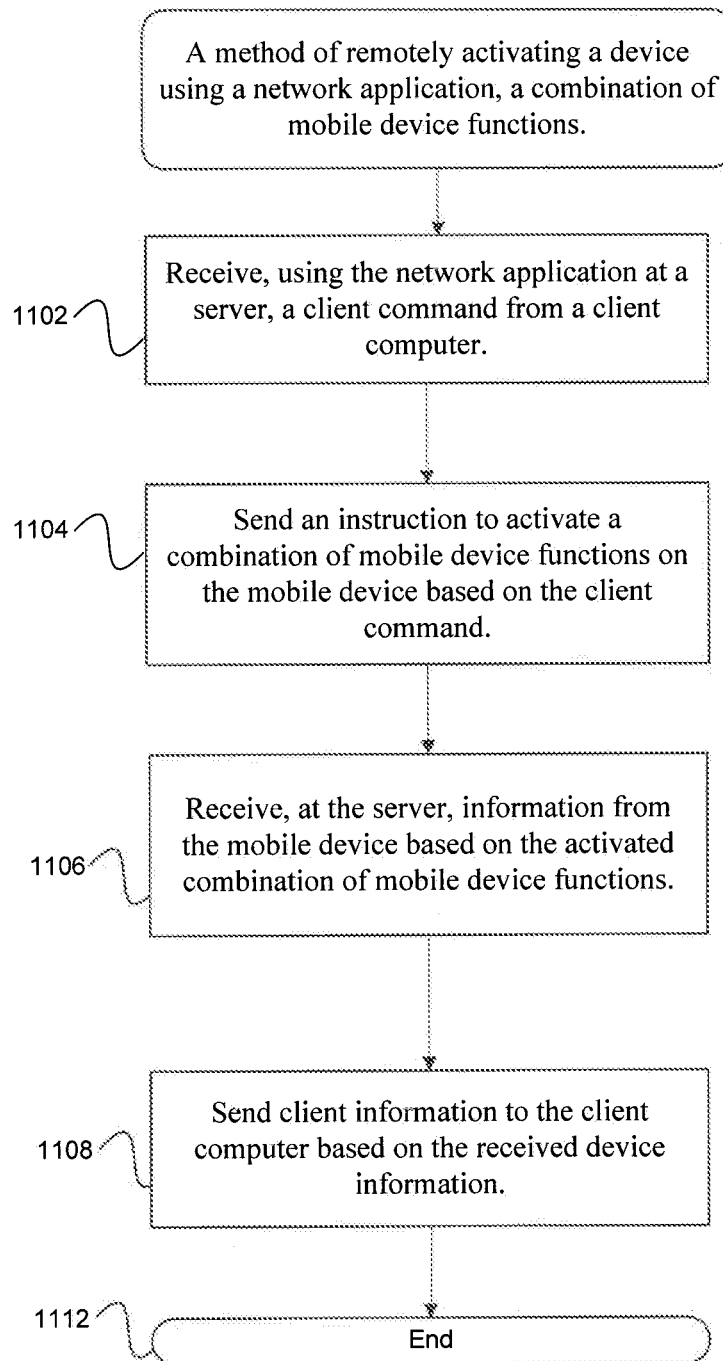


FIG. 10

1100**FIG. 11**

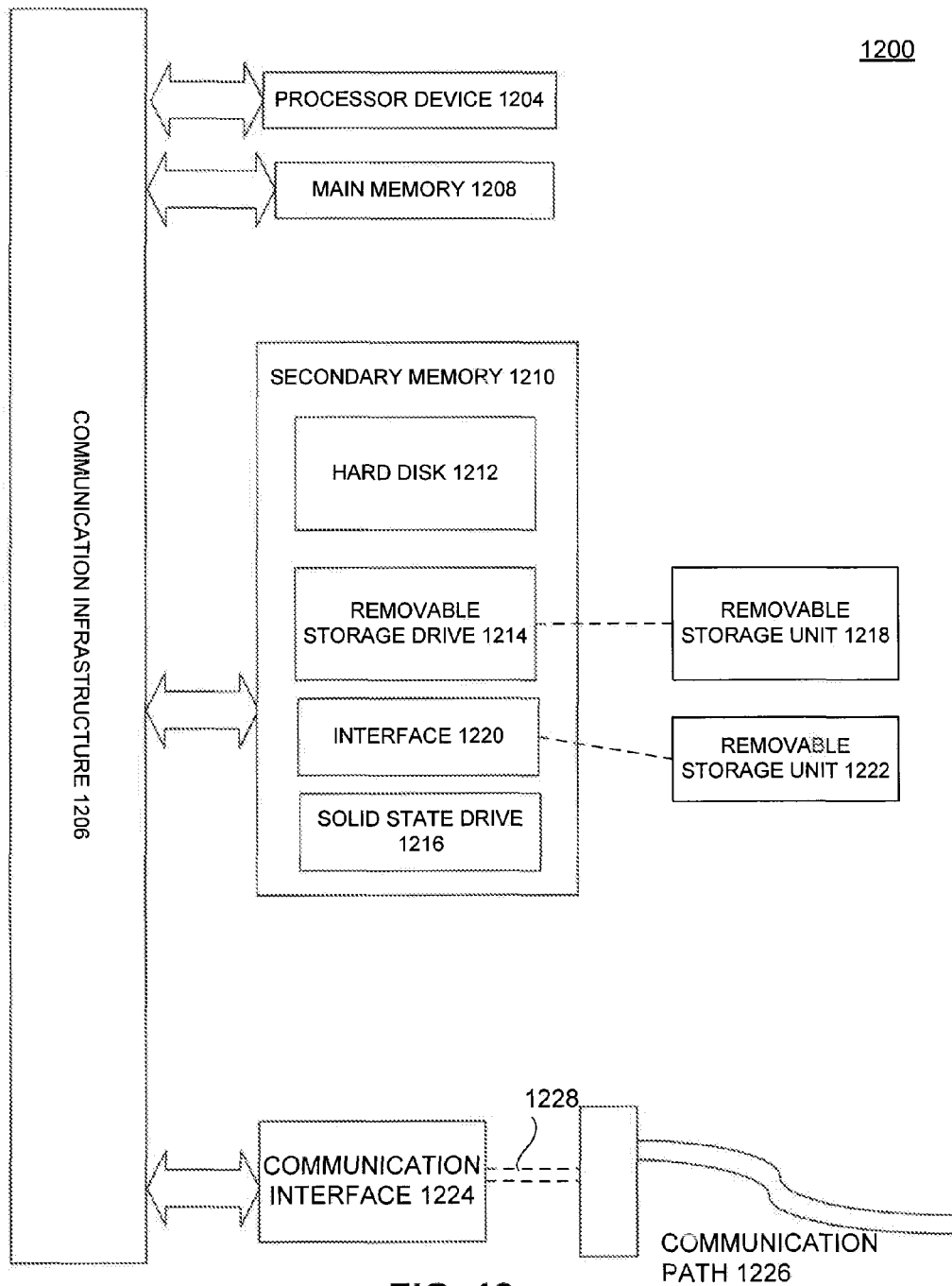


FIG. 12

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REMOTELY ACTIVATING A COMBINATION OF MOBILE DEVICE FUNCTIONS

BACKGROUND

1. Field

The field relates to mobile devices.

2. Related Art

Various types of mobile devices can provide different types of input and output functions. Input functions allow the mobile device to capture and relay information about surroundings and output functions allow the mobile device to cause device configuration changes and changes in the surroundings. Mobile device users are increasingly encountering a variety of circumstances where the remote coordination of a combination of different mobile device functions could be helpful.

It can be difficult to enable and coordinate the remote activation of diverse features and functions on a mobile device. This coordination becomes even more difficult when a particular goal is sought by the user.

SUMMARY

Embodiments described herein relate to remotely activating, using a network application, a combination of mobile device functions. According to an embodiment, a method of remotely activating, using a network application, a combination of mobile device functions includes receiving, using the network application at a server, a client command from a client computer and sending an instruction to activate a combination of mobile device functions on the mobile device based on the client command. The method further includes receiving, at the server, information from the mobile device based on the activated combination of mobile device functions and sending client information to the client computer based on the received information from the mobile device.

According to another embodiment, a system for remotely activating a combination of mobile device functions on a mobile device includes a computer server, a client computer and a network application on the computer server configured to receive a client command from the client computer. A remote combination controller is configured to send an instruction to activate a combination of mobile device functions on the mobile device based on the client command and receive information from the mobile device based on the activated combination of mobile device functions and send client information to the client computer based on the received information from the mobile device.

Further features and advantages, as well as the structure and operation of various embodiments are described in detail below with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE FIGURES

The accompanying drawings, which are incorporated in and constitute part of the specification, illustrate embodiments and, together with the general description given above and the detailed description of embodiments given below, serve to explain the principles of the present disclosure. In the drawings:

FIG. 1 is a block diagram depicting an example network application architecture, according to an embodiment.

FIG. 2 is a block diagram of a more detailed view of input functions in a mobile device, according to an embodiment.

FIG. 3 is a block diagram of a more detailed view of output functions in a mobile device, according to an embodiment.

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FIG. 4 is diagram of a remote combination application (RCA) user interface, according to an embodiment.

FIG. 5 is another block diagram of the user interface of a network-based application to an embodiment.

FIG. 6 is another block diagram depicting an example network application architecture, according to an embodiment.

FIG. 7 is a detailed view of a remote combination controller having a remote power manager, according to an embodiment.

FIG. 8 is a detailed view of a remote combination controller with a scene analyzer and a query generator, according to an embodiment.

FIG. 9 is a detailed view of a remote combination controller with disruption logic, according to an embodiment.

FIG. 10 is another block diagram depicting an example network application architecture with a remote combination controller, according to an embodiment.

FIG. 11 shows a flowchart illustrating a method of remotely activating, using a network application, a combination of functions on a mobile device, according to an embodiment.

FIG. 12 depicts a sample computer system that may be used to implement an embodiment.

DETAILED DESCRIPTION

The following detailed description refers to the accompanying drawings that illustrate exemplary embodiments. Other embodiments are possible, and modifications may be made to the embodiments within the spirit and scope of the disclosure. Therefore, the detailed description is not meant to limit the disclosure.

The embodiment(s) described and references in the specification to “one embodiment,” “an embodiment,” “an example embodiment,” etc., indicate that the embodiment(s) described may include a particular feature, structure, or characteristic. However, every embodiment may not necessarily include the particular feature, structure or characteristic. Moreover, such phrases are not necessarily referring to the same embodiment. When a particular feature, structure or characteristic is described in connection with an embodiment, it is understood that it is within the knowledge of one skilled in the art to effect such feature, structure, or characteristic in connection with other embodiments, whether or not explicitly described.

It would be apparent to one having skill in the relevant art(s) that the embodiments described below can be implemented in many different embodiments of software, hardware, firmware, and/or the entities illustrated in the figures. Any actual software code with the specialized control of hardware to implement embodiments is not limiting of this description. Thus, the operational behavior of embodiments is described with the understanding that modifications and variations of the embodiments are possible, given the level of detail presented herein.

Overview

FIG. 1 depicts an example network application architecture 100 in which embodiments, or portions thereof, may be implemented. Network application architecture 100 includes the following components linked by network 101: server 120, wireless transceiver 160 and client computer 150. Mobile device 110 is linked by wireless signal 162 to wireless transceiver 160. Client computer 150 includes web browser 140. Web browser 140 includes remote combination application user interface (RCA user interface) 146.

Generally speaking, some embodiments described herein enable a user to remotely activate a combination of mobile device functions using remote combination controller **190**. The remote activation can be performed by sending an instruction from remote combination controller **190** to mobile device **110**. The remote activation can be initiated and controlled using a network-based application controlled by the user, for example RC application **145** controlled by user **105** using RCA user interface **146**. Different combinations of device functions can be used to further a variety of goals. Example goals are discussed below with respect to FIGS. **6-11**.

As used herein, network **101** may be any network or combination of networks that can carry data communications. Such network **101** can include, but is not limited to, a local area network, medium area network, and/or wide area network such as the Internet. Network **101** can support protocols and technology including, but not limited to, World Wide Web protocols and/or services. Intermediate web servers, gateways, or other servers may be provided between components of the depicted network components depending upon a particular application or environment.

As used herein, mobile device **110** and other mobile devices discussed, may be any type of portable, microprocessor-based, user operated device. Typically, as used herein, mobile device **110** may refer to: a mobile phone, a smart phone or a tablet computer. An exemplary embodiment of mobile device **110** includes wireless connectivity through a broadband wireless network, for example mobile device **110** using wireless signal **162** to connect to network **101** via wireless transceiver **160**.

As used typically herein, a network-based application is an application with functions distributed between two or more computers linked by a network. In an embodiment of a network-based application described herein, a combination of mobile device functions are activated and controlled by a network-based application, e.g., remote combination application **145**. In this example, client computer **150** and server **120** are linked by network **101**, for example, the Internet, and RCA user interface **146** is generated using a hypertext transfer protocol (HTTP) displayed with web browser **140**. In different embodiments, different configurations, functions, networks and computers can be used.

In the embodiment shown on FIG. **1**, RC application **145** is a web-browser **140** implemented network-based application, but it is important to note that the functions described herein performed by RC application **145** can be performed by stand-alone and non-browser based applications as well (not shown).

As would be appreciated by one having skill in the relevant art(s), network-based applications such as RC application **145** generally have a server-side component executing on a server, e.g., server **120**. Server **120** has the host/server-side components of RC application **145**, and links, via network **101** to components on mobile device **110** and client computer **150**, for example RCA user interface **146**. Further details regarding the operation of remote combination application **145**, remote combination controller **190** and mobile device **110** are provided with respect to FIGS. **6-11** below, according to embodiments.

Mobile Device Functions

As discussed herein, mobile devices have a variety of functions, such functions being broadly classified herein as input functions and output functions. As used herein, input functions generally gather information, for example, sensors, microphones, cameras. Output functions cause the device to effect an external change on some part of its environment

and/or an internal change to the device. Based on the illustrative list of input function components and output function components in FIGS. **2** and **3** respectively, one having skill in the relevant art(s), given the description herein, would be able to identify additional similar components, along with uses within embodiments.

FIG. **2** is a detailed block diagram of mobile device **210** depicted having input functions, according to an embodiment. Mobile device **210** has input function controller **290** and several input function components: battery meter **275**, accelerometer **215**, compass **220**, Global Positioning System (GPS) **225**, broadband signal strength sensor **230**, screen sensor **235**, thermometer **240**, microphone **245**, cameras **250A-B**, Wi-Fi antenna **260**, Bluetooth antenna **265**, camera flash usefulness determiner **295** and proximity sensor **270**.

The following list of input function components IF1-IF13, as well as the input function components shown as part of mobile device **210** in FIG. **2**, are intended to be non-limiting and illustrative of different input function components that can be used by embodiments. Input function components IF1-IF13 are as follows:

IF1. Accelerometer **215**: As would be appreciated by one having skill in the relevant art(s), an accelerometer is an input component that measures the relative motion of the device.

IF2. Compass **220**: As would be appreciated by one having skill in the relevant art(s), a compass is a navigational instrument for determining direction relative to the Earth's magnetic poles.

IF3. Global Positioning System Receiver (GPS) **225**: As would be appreciated by one having skill in the relevant art(s), a GPS input component receives signals from a space-based global navigation satellite system (GNSS) and provides location and time information.

IF4. Broadband signal strength sensor **230**: As would be appreciated by one having skill in the relevant art(s), a broadband signal strength sensor measures the strength of various broadband signals reaching the device.

IF5. Screen touch sensor **235**: As would be appreciated by one having skill in the relevant art(s), a screen touch sensor senses a touch interaction with a device display screen.

IF6. Thermometer **240**: As would be appreciated by one having skill in the relevant art(s), a thermometer measures the ambient temperature around the device.

IF7. Microphone **245**: As would be appreciated by one having skill in the relevant art(s), a microphone is a sensor that converts sound into an electrical signal.

IF8. Cameras **250A-B**: As would be appreciated by one having skill in the relevant art(s), a camera can capture either a still image or a video of a scene around the device.

IF9. Wi-Fi Antenna **260**: As would be appreciated by one having skill in the relevant art(s), a Wi-Fi antenna receives signals encoded using the Wi-Fi communications standard.

IF10. Bluetooth Antenna **265**: As would be appreciated by one having skill in the relevant art(s), a Bluetooth antenna receives signals encoded using the Bluetooth communications standard.

IF11. Proximity Sensor **270**: As would be appreciated by one having skill in the relevant art(s), a proximity sensor measures the proximity of an object and/or person to a point on the device, e.g., the device screen.

IF12. Battery Meter **275**: As would be appreciated by one having skill in the relevant art(s), a battery meter measures the remaining charge in the device battery.

IF13. Camera Flash Usefulness Determiner **295**: As would be appreciated by one having skill in the relevant art(s), camera flash usefulness determiner can use information from

light sensor **280** to determine whether the use of camera flash **335** would be likely to improve a visual representation captured by cameras **250A-B**.

As would be appreciated by one having skill in the relevant art(s), given the description herein, different mobile devices in embodiments can have different input components for gathering information into mobile device **210**. Input function controller **290** is a component used by an embodiment to control one or more input functions in mobile device **210**.

FIG. 3 is another detailed block diagram of mobile device **120**, depicted having output functions, according to an embodiment. Mobile device **120** has output function controller **390** and several output function components: speakerphone speaker **315**, vibration motor **320**, screen display **325**, lights **330A-B**, camera flash **335**, ringer speaker **340**, dialer **345**, storage controller **350**, power manager **355**, device status controller **360**, usefulness determiner **395** and ear speaker **365**.

The following list of output function components OF1-OF12, as well as the output function components shown as part of mobile device **310** in FIG. 3, is intended to be non-limiting and illustrative of different output function components that can be used by embodiments. Output function components OF1-OF12 are as follows:

OF1. Ear speaker **365**: As would be appreciated by one having skill in the relevant art(s), an ear speaker is a speaker positioned on the device so that it can be placed next to the ear of the user.

OF2. Speakerphone speaker **315**: As would be appreciated by one having skill in the relevant art(s), a speakerphone speaker on the device is generally used for presenting louder sounds than ear speaker **310**.

OF3. Vibration motor **320**: As would be appreciated by one having skill in the relevant art(s), a vibration motor is used by the device to cause a vibrating notification indication on the device, e.g., for silent notification of a pending received call.

OF4. Screen display **325**: As would be appreciated by one having skill in the relevant art(s), a screen display (also known as a screen) is generally used to display a user interface on the device. This component may also be used for any type of visual/textual notification.

OF5. Lights **330A-B**: As would be appreciated by one having skill in the relevant art(s), lights on the device can emit light for different purposes.

OF6. Camera flash **335**: As would be appreciated by one having skill in the relevant art(s), a camera flash provides a short burst of additional light timed to improve a captured photo.

OF7. Ringer speaker **340**: As would be appreciated by one having skill in the relevant art(s), a ringer speaker provides a notifying noise that alerts a user to a waiting phone call.

OF8. Dialer **345**: As would be appreciated by one having skill in the relevant art(s), a dialer can dial a telephone component on a device.

OF9. Storage controller **350**: As would be appreciated by one having skill in the relevant art(s), a storage controller manages the storage on a device. Functions that can be performed by this component include copying and erasing stored content on the device.

OF10. Power manager **355**: As would be appreciated by one having skill in the relevant art(s), a power manager manages the power consumption by the device, especially consumption of battery power.

OF11. Device status controller **360**: As would be appreciated by one having skill in the relevant art(s), a device status

controller can control status aspects of a device, including whether the device is on or off, and whether the screen display is enabled.

OF12. Usefulness Determiner **395**: This component analyzes characteristics of a captured visual representation to determine whether the representation is likely to be useful to determine a location of mobile device **310**. Factors that suggest usefulness include whether the representation is of an outdoor scene, whether any text appears in the representation and whether it is daytime or nighttime in the scene.

As would be appreciated by one having skill in the relevant art(s), given the description herein, different mobile devices in embodiments can have different components for performing output functions generally and described herein. Output function controller **390** is a component used by an embodiment to control one or more output functions in mobile device **310**.

The input, output and controller functions described herein need not be performed by separate components, rather the functions can be flexibly performed by different combinations of hardware and software components. Different implementation examples are discussed further below with respect to FIGS. 6-10.

Function Combinations Generally

The illustrative device input and output functions noted above are used, in different combinations by embodiments, controlled by a user with a network application, for example, RC application **145** from FIG. 1. Listed below are different feature combinations that use input and/or output feature components listed above with the descriptions of FIGS. 2 and 3. A user can select combinations to further a particular goal, though a goal does not need to be selected. The goal examples listed below can be useful when considering the purposes of activating different combinations of mobile device functions. The goals listed below also may be used on an embodiment of RCA user interface **146** to visually organize different combinations for user **105**. An example of such an interface is discussed with, and depicted in, FIG. 5.

FIG. 4 is a block diagram of a more detailed view of server **420** having remote combination controller **490**, according to an embodiment. Server **420** is coupled to server storage **470**, such server storage **470** having combination profiles **475A-B**. Server **420** hosts remote combination (RC) application **445** and remote combination (RC) controller **490**.

Remote combination controller uses combination profiles **475A-B** to activate different combinations of functions on mobile device **110**. Remote combination application receives indications from user **105** via client computer **150** and RCA user interface **146** from FIG. 1.

FIG. 5 is a diagram of an example user interface of RC application user interface **510**. RC application user interface shows goals **515A-B**, each goal **515A-E** having respective combinations **516A-C**, **517**, **518A-B**, **519A-B** and **520**.

As discussed farther below with respect to FIG. 6, goals **515A-E** can provide a useful approach to grouping combinations **516A-C**, **517**, **518A-B**, **519A-B** and **520**. User **105**, when using RC application user interface **510**, can quickly locate the combinations potentially helpful for a particular situation. As would be appreciated by one having skill in the relevant art(s), given the description herein, combinations can appear grouped in one or more goals, combinations need not be grouped to be used within an interface and additional goals can be addressed using the teachings herein.

Goals **515A-E** and associated combinations are discussed further below.

Goal **515A**: Respond to Lost Device

FIG. 6 depicts an example network application architecture **600** in which embodiments, or portions thereof, may be implemented. Network application architecture **600** includes the following components linked by network **101**: server **620**, wireless transceiver **160**, and client computer **650**. Mobile device **610** is linked by wireless signal **162** to wireless transceiver **160**. Client computer **650** includes an interface, e.g., RC application user interface **510** to RC application **645**. Server **620** has RC controller **690** and RC application **645**. User **605** is shown with client computer **650** and person **607** is shown with mobile device **610**.

In an example shown in FIG. 6, mobile device **610** is owned by user **605**, and is lost or misplaced. In an embodiment described herein, mobile device **610** is in the possession of person **607**, and in another embodiment, mobile device **610** is not possessed by anyone. In variations of an embodiment described above, person **607** may or may not intend to return mobile device **610** to User **605**.

Based on the example detailed with respect to FIG. 6 above, user **605** has a goal of regaining possession of mobile device **610**. Different combinations of device functions potentially useful to this end are discussed with respect to FIGS. 7-10 below. Using RC application user interface **510**, user **605** selects from combinations **516A-D** displayed grouped with goal **515A**—responding to lost device.

For devices without constant data connections, you could also log lots of input info to be uploaded at the next connection (e.g. wifi or wired)

Combination **516A**: Power-Saver

FIG. 7 depicts a detailed view of RC controller **790** in an example network application architecture **700**, according to an embodiment. Network application architecture **700** has mobile device **710**, network **101**, client **750** and server **720**. Server **720** has RC controller **790** with remote power manager **792**.

In an embodiment, a combination of features can be remotely activated on a mobile device that is tailored to conserve battery life. Based on the power characteristics of mobile device **710**, remote power manager **792** can remotely manage remaining battery power on the device. In an example, person **607** does not have the accessories or intent to charge mobile device **610**. Because available power is necessary to perform other mobile device functions described herein, the power saver combination may also be used with other function combinations discussed with respect to FIGS. 8-10 below.

Different input and output function components can be activated in combination to perform the power-saver function.

Power manager **355**: Because power savings may not be configured to function on lost mobile device **610**, this function can be activated and configured remotely, in an embodiment.

Remote power manager **792**: As noted above, mobile device **110** may already have a component (power manager **355**) designed to conserve power on the device. In an embodiment, remote power manager **792** can be specifically configured to conserve power in a lost/misplaced mobile device. Instead of conserving power with functions enabled as is generally performed by power manager **355**, remote power manager **792** can have different power savings approaches configured—such approaches designed to enable useful locating functions, for example, GPS **225**, while disabling functions that may not be helpful to searching user **605**, for

example, dialer **345**. In another embodiment, the functions described with respect to FIGS. 8-10 below can be performed while power management approaches enforced by power manager **355** are controlling.

Device status controller **360**: As described above with respect to FIG. 3, device status controller **360** can control the status, for example powered on or off, of mobile device **710**. An embodiment uses RC controller **790** to power off mobile device **710** for power savings—powering the device on periodically to perform different useful locating functions, as discussed with respect to FIGS. 8-10 below.

Battery meter **275**: This input function can be used by an embodiment of the power saver combination **516A** to monitor the status of the battery of mobile device **710**. As would be appreciated by one having skill in the relevant art(s), given the description herein, remote power manager **792** can use the information of battery meter **275** to use different battery savings approaches on mobile device **710**.

Combination **516B** Identify Location by Visual Characteristics

FIG. 8 depicts a detailed view of RC controller **890** in an example network application architecture **800**, according to an embodiment. Network application architecture **800** has mobile device **810**, network **101**, client **850**, search engine **801** and server **820**. Server **820** has RC controller **890** with query generator **865** and scene analyzer **860**. Mobile device **810** has camera **857** and image analyzer **855**.

In an embodiment, a combination of features can be remotely activated on a mobile device that is tailored to identify the current location of the mobile device using visual characteristics. Generally speaking, this combination of features uses mobile device input feature components to capture characteristics of the current location of the mobile device. Input feature components used in combination can include cameras **250A-B**, microphone **245**, Bluetooth antenna **265**, thermometer **240** and compass **220**. This list of example input function components is intended to be non-limiting, and embodiments can use additional or fewer components to perform combination functions listed below.

GPS-based location determination may not be available at all times to identify the location of the mobile device. Indoor locations and locations within “urban canyons” can act to block the geographic location determining functions of GPS devices. An embodiment uses a combination of other input function components to estimate the location of the mobile device.

For example, when this combination is activated, input function controller **290** directs camera **250A** (in this example, a “rear-facing” mobile device camera) to capture a digital picture. This captured picture may not provide any useful information—e.g., when the mobile device is up against a person’s head, in a pocket or car glove compartment. Because of the orientation of the mobile device, the captured picture may show the outdoor or indoor scene where the mobile device is located. In a variation of the embodiment where camera **250A** captures a digital picture, camera **250A** can be used to capture a video of the surrounding environment. As would be appreciated by one having skill in the relevant art(s), given the description herein, this video may provide lower image quality, but because of its continuous nature, have more information about the environment. In the embodiments using digital pictures discussed below, a video can also be used, with potential differences in quality and information.

In a variation of this example, to improve the quality of the captured image, at the time camera **857** is set to take the digital image, output function controller **390** can direct camera flash **335** to be used. In another variation, camera flash **335**

is not used because its use could alert a person possessing the mobile device to the digital picture capture.

Continuing this example, using the wireless data transfer functions of the mobile device, the digital image is sent to server **820**. Because of the battery usage associated with sending data wirelessly from the mobile device, in a variation of this example, before sending, the digital image is analyzed by scene analyzer **860**, such analysis determining whether the digital image contains useful scene information. One having skill in the relevant art(s), given the description herein, will appreciate that scene analyzer **860** can use various approaches to determining whether the digital image is likely to show the surroundings of mobile device **810**. By not sending a useless digital image, battery life on the mobile device can be saved.

Continuing this example, once received by server **820**, the digital image can be forwarded to RC application **145** for viewing by the mobile device owner. Identifying a location from a digital image can be difficult however, and an embodiment provides additional functions to this end.

In an embodiment, once the digital image is received by server **820**, the digital image is analyzed by scene analyzer **860** to identify location characteristics from the captured scene. Example location characteristics that could be identified include buildings, signs, places of business and vehicles, e.g., planes, trains, boats, and buses. At this stage, in an embodiment, location characteristics are identified as useful characteristics, but their significance is not yet identified.

To identify the significance of the identified location characteristics, an embodiment uses search resources, for example a search engine. Using the identified location characteristics, query generator **865** generates a query for submission to search engine **801**. In embodiments, the query may be textual, e.g., generated from a road sign characteristic, or visual, e.g., a cropped picture of a building from the captured digital image.

Once results are generated by the utilized search resource, e.g., search engine **801**, the search results can be forwarded via device interface **430**, along with the captured digital image and/or the identified location characteristics, to RC application **145** for viewing by device owner.

In a variation of the above embodiments, additional input feature components can also be used to capture location characteristics for location identification. Items LC1-LC4 below are intended to be non-limiting examples of the uses of different components:

LC1. Thermometer **240**: In certain circumstances, thermometer **240** may provide useful location characteristics, e.g., whether the mobile device is inside or outside.

LC2. Compass **220**: By annotating the captured image with a facing direction, additional picture interpretation information can be provided to search engine **801** and device owner.

LC3. Bluetooth Antenna **260**: Detecting the presence of Bluetooth signals can give an indication of how public a location the mobile device is in. Presumably, a location with several detected Bluetooth signals has a higher density of people nearby.

LC4. Camera **857**: As noted above, camera **857** can also capture video of the environment. When video is available, scene analyzer **860** can use frame captures to identify location characteristics. Other known video analysis approaches can also be used.

As would be appreciated by one having skill in the relevant art(s), given the description herein, additional mobile device functions can also be used to capture characteristics of a location.

Combination **516C**: Disruption

FIG. **9** depicts a detailed view of RC controller **990** in an example network application architecture **900**, according to an embodiment. Network application architecture **900** has mobile device **910**, network **101**, client **950** and server **920**. Server **920** has RC controller **990** and disruption controller **965** with disruption logic **960**. Person **915** is shown with mobile device **910**. Server **920** also has distraction controller **970** having distraction logic **960**. These distraction components are described with reference to goal **515C**—remote distraction, below.

In an embodiment, a combination of features can be remotely activated on a mobile device that are tailored to make the mobile device disruptive to people around it. Generally speaking, this combination of features uses output feature components to make the device disruptive to people nearby, e.g., by generating disruptive sounds, playing disruptive music, firing the camera flash, displaying disruptive pictures on the mobile device screen and/or using the vibration motor to vibrate the mobile device. Input feature components are used to inform disruption controller **965** about the current position of the mobile device. Disruption controller **965** is configured to use the provided sensory input to time the use of the output feature components for enhanced disruption. Disruption logic **960** can be used to select combinations of device features that can cause disruption. Examples IR1-IR2 are an illustrative and non-limiting list of combinations of features that can be used to generate disruptive output. Examples IR1-IR2 are listed below:

IR1. Proximity sensor **270** and speakerphone speaker **315** combination: Based on a determination by proximity sensor **270** that the mobile device is likely close to a person, disruption controller **965** can send an instruction to direct mobile device speakers, to play a loud noise.

IR2. Light sensor **280** and microphone **245** combination: Based on the current time of day, for example, 2 AM, a measurement by light sensor **280** that the surroundings are dark, and a measurement by microphone **245** that the surroundings are quiet, disruption controller **965** can send an instruction to play a loud, disturbing noise, for example, an alarm clock. Camera flash **335** can also be used to provide disruptive light output.

One having skill in the relevant art(s), given the description herein, will appreciate additional disruptive uses for output function components and additional useful input information that can be provided by input function components.

Combination **516D**: Identify Location by Other Sensors

In an embodiment, a combination of features can be remotely activated on a mobile device that is tailored to identify the current location of the mobile device using additional sensors from those discussed with combination **516B** above.

Thermometer

In one example thermometer **240** is used to measure the ambient temperature of mobile device **210**. Using the wireless data transfer functions of mobile device **210**, the measured temperature is sent to server **820**. Once received by server **820**, the measured temperature can be forwarded to RC application **145** for viewing by the owner of mobile device **210**. Identifying location information from temperature alone can be difficult however, and an embodiment provides additional functions to this end.

In an embodiment, the remotely measured temperature on lost mobile device **210** can be combined with other sensor information gathered by the mobile device, e.g., sensors discussed with combination **516B** above. For example, a temperature reading can be used to estimate whether the device is in a person's pocket. Combining the measured temperature

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with an estimated weather forecast can allow an embodiment to identify whether mobile device **210** is exposed to weather elements, inside, or in a bag, etc. This information, for example, when combined with a more precise location estimate, can allow an mobile device owner to have more pinpoint information about the location of mobile device **210**.

In other embodiments, a temperature measurement can provide a basis for a geographic location estimate. When a temperature measurement is compared to weather forecasts, different potential geographic locations can be provided. Combining these provided potential geographic locations with photographic information discussed in combination **516C**, for example, can provide additional accuracy to an estimated geographic location.

To identify the significance of the identified temperature characteristics, an embodiment uses search resources, for example a search engine. Using the measured temperature, query generator **865** can generate a query for submission to search engine **801**.

Once results are generated by the utilized search resource, e.g., search engine **801**, the search results can be analyzed and forwarded via device interface **430** for viewing by device owner.

Accelerometer

In another example, accelerometer **215** can be used to measure the movement of mobile device **210**. Using the wireless data transfer functions of mobile device **210**, the movement measurements are sent to server **820**. Once received by server **820**, the movement measurements can be forwarded to RC application **145** for viewing by the owner of mobile device **210**. Identifying location information from movement alone can be difficult however, and an embodiment provides additional functions to this end.

In an embodiment, the movement measurements on lost mobile device **210** can be combined with other sensor information gathered by the mobile device, e.g., sensors discussed with combination **516B** above. For example, a movement measurements can be used to estimate whether the device is in a moving vehicle, or being carried by a person walking/running. Combining the measured movement information with other, more precise geographic measurements can allow an mobile device owner to have more pinpoint useful information about the current location of mobile device **210**. For example, when an owner of lost mobile device **210** checks a geographic area for their lost device, knowing that the device is likely being carried by a person walking may be helpful.

Pressure Sensor

In another example, pressure sensor **205** can be used to measure the ambient barometric pressure/altitude of mobile device **210**. Using the wireless data transfer functions of mobile device **210**, the pressure measurements are sent to server **820**. Once received by server **820**, the pressure measurements can be forwarded to RC application **145** for viewing by the owner of mobile device **210**. Identifying location information from pressure measurements alone can be difficult however, and an embodiment provides additional functions to this end.

In an embodiment, the pressure measurements on lost mobile device **210** can be combined with other sensor information gathered by the mobile device, e.g., sensors discussed with combination **516B** above. For example, pressure measurements can be used to estimate whether the device is gaining or losing altitude. Depending on the speed of the pressure changes, an assessment can be made by an embodiment that mobile device **210** is in a tall building or at ground level. Such altitude measurements can be essential in finding

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a device in an urban environment, where geographic locations may have large vertical components.

In another embodiment, the measured pressure can be used to track the changes in altitude of lost device **210** over time. Rapid changes in altitude can lead to an estimation that mobile device **210** is in an airplane. This airplane estimation can also be provided based on the measured altitude alone, e.g., no buildings exist at 29,000 feet above sea level. Because altitude measurements in airplanes may not be able to be transferred in real-time, an embodiment can store measurements and transfer them to server **820** when connectivity is reestablished. One having skill in the relevant art(s), given the description herein, will appreciate that all types of sensor measurements described herein can be stored and sent to server **820** in this delayed fashion.

Goal **515B**: Child Monitor

FIG. **10** depicts a detailed view of RC controller **1090** in an example network application architecture **1000**, according to an embodiment. Network application architecture **1000** has mobile device **1010**, network **101**, client **1050** and server **1020**. Server **1020** has RC controller **1090**. Child **1015** is shown with mobile device **1010** in room **1016**. User **1005** is shown with client **1050**.

Combination **517**: Monitor Child

In an embodiment, a combination of features can be remotely activated on a mobile device that is tailored to allow the mobile device to perform child monitoring (also termed herein baby monitoring) functions. Generally speaking, this combination of features uses input and output feature components to make the mobile device relay information about the status of a child.

In an example embodiment, a guardian (e.g., user **1005**) deems as requiring monitoring, child **1015** in room **1016**. As discussed further below, different options can be used to situate mobile device **1010** in room **1016**. Example monitoring features M1-M5 are listed below as examples of features that can be remotely activated by embodiments, either alone or in combination. Features M1-M5 are listed below:

M1. Microphone **245**: Microphone **245** can be activated to capture and relay ambient sound from room **1016** to server **1020** and RC application **1045**. As discussed above with respect to FIG. **4**, RC application **1045** relays the captured ambient sound to client **1050** where it can be presented to user **1005** via an RCA interface, e.g., RCA user interface **146** from FIG. **1**.

M2. Accelerometer **215**: In another embodiment, mobile device **1010** can be arranged in room **1016** so that additional input functions of mobile device **1010** can provide useful information. For example, attaching mobile device **1010** to a crib where child **1015** is placed (not shown) could enable accelerometer **215** input function to gather child **1015** movement information. When this movement information is combined with the audio information collected by microphone **245** a more complete status of child **1015** can be relayed to client **1050** by RC application **1045**.

M3. Light Sensor **280**: In a variation of the above embodiments, light sensor **280** in mobile device **1010** can be activated with a combination of other mobile device **1010** functions (e.g., microphone **245** and/or accelerometer **215**). Light sensor **280** can provide information about ambient light in room **1016**. As would be appreciated by one having skill in the relevant art(s), given the description herein, combining knowledge of stimuli in room **1016**, such as ambient light, can help user **1005** to determine whether child **1015** requires personal attention.

M4. Proximity Sensor **270**: In a variation of the above embodiments, proximity sensor **270** in mobile device **1010**

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can be activated with a combination of other mobile device **1010** functions (e.g., microphone **245** and/or accelerometer **215**). Proximity sensor **270** can provide information about objects in proximity to mobile device **1010**. As noted above with the discussion of accelerometer **215** in this section, mobile device **1010** can be arranged in such a fashion as to allow additional input functions to collect information. Depending upon the sensitivity of proximity sensor **270** and fashion in which it has been mounted in room **1016**, proximity sensor **270** can provide information as to whether child **1015** is moving or has moved. As discussed herein, the individual pieces of information collected by input functions may not provide a useful status of child **1015**. The combination of activated functions however, can provide a more complete status.

M5. Speakerphone Speaker **315**: In an embodiment, speakerphone speaker **315** in mobile device **1010** can be activated to play soothing sounds. The soothing sounds can be activated by the user or automatically, in response to sounds detected using feature M1 described above.

Goal **515C**: Remote Distraction

As noted above, server **920** from FIG. **9** also has distraction controller **970** having distraction logic **960**. In a variation of the embodiment shown in FIG. **9**, a combination of features can be remotely activated on mobile device **910** that are tailored to make the mobile device distracting to people around it for a period of time.

For example, by generating distinctive sounds, playing music, firing the camera flash, displaying pictures on the mobile device screen and/or using the vibration motor to vibrate the mobile device, the mobile device can be made distracting to people around.

In one example use, the owner of mobile device **910** wants to distract person **915** for a period of time so as to set up an enjoyable surprise for person **915**. Using an embodiment to this end, the owner of mobile device **910** hides mobile device in a location proximate to person **915**. In this example, the owner of mobile device **910** wants to leave a gift for person **915** in the entryway to their house. Mobile device **910** is hidden in the back of the house belonging to person **915**, and configured, via RC controller **990**, to make mobile device **910** distracting.

Distraction logic **960** can use output function controller **390** to control output functions such as speakerphone speaker **315**, ringer speaker **340**, light **330A**, screen display **325**, and vibration motor **320** to make mobile device **910** produce distracting output in its hidden location. While person **915** is distracted by output generated by mobile device **910**, the owner of mobile device **910** can place the surprise gift. Different Combination **518A** can be distraction using only audible output components (e.g., speakerphone speaker **315**, ringer speaker **340**), and combination **518B** can be distraction using a combination of audible and visual output components (e.g., ringer speaker **340**, light **330A**, screen display **325**). One having skill in the relevant art(s), given the description herein, will appreciate additional output function combinations that can be used by embodiments to accomplish different useful distracting applications.

Goal **515D**: Remote Announcer

In an embodiment, a combination of features can be remotely activated on a mobile device that is tailored to make announcements using mobile device **910**. Output feature components used in combination **519A** to make announcements include speakerphone speaker **315**, ringer speaker **340**, lights **330A-B**, screen display **325**, and vibration motor **320**. The speaker components (**315**, **340**) can be used to make the announcements and a combination **519B** of visual compo-

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nents (lights **330A-B**, screen display **325**) can be used to alert an audience that an announcement is forthcoming. Vibration motor **320** can also be used.

In different embodiments, announcements can be ad-hoc, or scheduled. For example, the owner of mobile device **910** may want to make scheduled and ad-hoc announcements to a person **915** for which they have care responsibility. The need to take a medicine at a particular time is a scheduled announcement that can be performed on mobile device **910** using RC controller **990**. Scheduled announcements can call out the time every hour, on the hour, or alert person **915** that bed time is soon.

An ad-hoc announcement example would be a suggestions that person **915** watch a particular television show. This list of example output function components and announcements is intended to be non-limiting, and embodiments can use additional or fewer components to perform different types of announcements.

Goal **515E**: Active Frame

In an embodiment, a combination of features can be remotely activated on a mobile device that is tailored to have mobile device **910** become an active display frame. This active display frame can be addressable by network **101** and server **920**. Using RC controller **990**, pictures & video (live and recorded) can be displayed on mobile device **910**. Other examples allow applications to be delivered to mobile device **910** and installed thereon. In this example, mobile device **910** acts as a hilly addressable multimedia terminal you could use for advertising, public safety announcements, etc.

Combination **520** on FIG. **5** is an example combination of screen display **325**, speakerphone speaker **315**, ringer speaker **340**, lights **330A-B**, screen display **325**, and vibration motor **320** that can be configured to perform multimedia terminal functions. One having skill in the relevant art(s), given the description herein, will appreciate how different output functions can be combined and used to perform a broad variety of active frame functions.

Method

FIG. **11** illustrates an exemplary method **1100** of remotely activating a device using a network application, a combination of mobile device functions.

As shown in FIG. **11**, method **1100** begins at stage **1102** where the network application at a server is used to receive a client command from a client computer. In an embodiment, RC application **145** at server **120** receives a client command from RCA user interface **146** operating in web browser **140** on client computer **150**. The client command corresponds to a command to identify a location of the mobile device using visual characteristics. In another embodiment, the client command corresponds to a command to manage power consumption on the mobile device. In yet another embodiment, the client command corresponds to a command to make the mobile device disruptive. In another embodiment, the client command corresponds to a command to monitor the surroundings of a mobile device. Once stage **1102** is complete, method **1100** proceeds to stage **1104**.

At stage **1104**, a combination of mobile device functions is activated on the mobile device based on the client command. For example, a combination of mobile device functions including camera **857** from FIG. **8** and camera flash **335** from FIG. **3** are activated on the mobile device based on the client command to identify the mobile device location by visual characteristics. Camera **857** is directed to take a picture of the mobile device surroundings and camera flash **335** is set to flash, if required.

In another example, a combination of mobile device functions including battery meter **275**, power manager **355** and

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device status controller **360** from FIGS. **2** and **3** are activated on the mobile device based on the client command to manage power consumption on the mobile device.

In yet another example, a combination of sensors on the mobile device to capture characteristics of the surroundings of the mobile device, e.g., based on a client command to make the mobile device disruptive, from FIG. **2**, a combination of microphone **245**, cameras **250A-B**, proximity sensor **270**, accelerometer **215** and light sensor **280** can be activated.

In another example of an activation of a combination of mobile device functions, a combination of input components on the mobile device can be activated to capture information related to the surroundings of the mobile device, such activation based on a client command to remotely monitor the surroundings of a mobile device, e.g., a combination of microphone **245**, cameras **250A-B**, proximity sensor **270**, accelerometer **215** and light sensor **280** can be activated. Once stage **1104** is complete, method **1100** proceeds to stage **1106**.

At stage **1106**, at the server, information is received from the mobile device based on the activated combination of mobile device functions. In the example where a command to identify a location of the mobile device using visual characteristics is received, the picture captured by camera **857** is received by remote combination controller **890** on server **820**.

In the example where a command to manage power consumption on the mobile device is received, information from the mobile device describing the remaining battery power and power consumption can be collected by battery meter **275**, power manager **355** and device status controller, and relayed to remote power manager **792** in FIG. **7**.

In the example where a command to make the mobile device disruptive is received, information from the mobile device describing the surroundings of the mobile device can be received from microphone **245**, cameras **250A-B**, proximity sensor **270**, accelerometer **215**, and light sensor **280**. Disruption logic **960** can use visual information collected by cameras **250A-B** (e.g., it is dark), and audio information from microphone **245** (e.g., it is quiet), to determine that a loud noise produced by speakerphone speaker **315** and a bright light produced by camera flash **335** is likely to be disruptive to a proximate mobile device **310** user.

In the example where a command to monitor the surroundings of a mobile device is received, information from the mobile device can include an audio stream from mobile device **210** captured by microphone **245** and a video stream from mobile device **210** captured by camera **250A**. Once stage **1106** is complete, method **1100** proceeds to stage **1108**.

At stage **1108**, client information is sent to the client computer based on the received information from the mobile device. For example, remote combination controller **890** uses scene analyzer **860** to analyze the received picture, and query generator **865** generates a query to search engine **801** based on the analysis. Based on the query, search engine **801** provides results including a likely location for mobile device **810**. Finally, the likely location result is sent to client **850**.

In the example where a command to manage power consumption on the mobile device is received, information from the mobile device describing the remaining battery power and power consumption collected by battery meter **275** is sent to client computer **150** to provide a mobile device user **105** with an updated status on the remaining battery power of the device.

In the example where a command to make the mobile device disruptive is received, updated information from the mobile device describing the surroundings of the mobile device can also be received. Using this updated information,

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user **105** can be provided with a confirmation that disruptive output actions were performed by mobile device **110**.

In the example where a command to monitor the surroundings of a mobile device is received, information sent to client computer **150** from the mobile device can include the previously noted audio stream captured by microphone **245** and video stream captured by camera **250A**. After the completion of stage **1108**, method **1100** ends.

Example Computer System Implementation

FIG. **12** illustrates an example computer system **1200** in which embodiments, or portions thereof, may be implemented. For example, portions of systems or methods illustrated in FIGS. **1-11** may be implemented in computer system **1200** using hardware, software, firmware, tangible computer readable media having instructions stored thereon, or a combination thereof, and may be implemented in one or more computer systems or other processing systems. Hardware, software or any combination of such may embody any of the modules/components in FIGS. **1-10** and any stage in FIG. **11**. Mobile devices (**110**, **210**, **310**, **610**, **710**, **810**, **910**, **1010**), servers (**120**, **420**, **620**, **720**, **820**, **920**, **1020**), client computers (**150**, **650**, **750**, **850**, **950**, **1050**) and search engine **801** can also be implemented using components of computer system **1200**.

One of ordinary skill in the art may appreciate that embodiments of the disclosed subject matter can be practiced with various computer system and computer-implemented device configurations, including smartphones, cell phones, mobile phones, tablet PCs, multi-core multiprocessor systems, mini-computers, mainframe computers, computer linked or clustered with distributed functions, as well as pervasive or miniature computers that may be embedded into virtually any device.

For instance, at least one processor device and a memory may be used to implement the above described embodiments. A processor device may be a single processor, a plurality of processors, or combinations thereof. Processor devices may have one or more processor 'cores.'

Various embodiments are described in terms of this example computer system **1200**. After reading this description, it will become apparent to a person skilled in the relevant art how to implement embodiments using other computer systems and/or computer architectures. Although operations may be described as a sequential process, some of the operations may in fact be performed in parallel, concurrently, and/or in a distributed environment, and with program code stored locally or remotely for access by single or multi-processor machines. In addition, in some embodiments the order of operations may be rearranged without departing from the spirit of the disclosed subject matter.

As will be appreciated by persons skilled in the relevant art, processor device **1204** may be a single processor in a multi-core/multiprocessor system, such system operating alone, or in a cluster of computing devices operating in a cluster or server farm. Processor device **1204** is connected to a communication infrastructure **1206**, for example, a bus, message queue, network or multi-core message-passing scheme.

Computer system **1200** also includes a main memory **1208**, for example, random access memory (RAM), and may also include a secondary memory **1210**. Secondary memory **1210** may include, for example, a hard disk drive **1212**, removable storage drive **1214** and solid state drive **1216**. Removable storage drive **1214** may include a floppy disk drive, a magnetic tape drive, an optical disk drive, a flash memory, or the like. Removable storage drive **1214** reads from and/or writes to a removable storage unit **1218** in a well known manner.

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Removable storage unit **1218** may include a floppy disk, magnetic tape, optical disk, etc. which is read by and written to by removable storage drive **1214**. As will be appreciated by persons skilled in the relevant art, removable storage unit **1218** includes a computer readable storage medium having stored therein computer software and/or data.

In alternative implementations, secondary memory **1210** may include other similar means for allowing computer programs or other instructions to be loaded into computer system **1200**. Such means may include, for example, a removable storage unit **1222** and an interface **1220**. Examples of such means may include a program cartridge and cartridge interface (such as that found in video game devices), a removable memory chip (such as an EPROM, or PROM) and associated socket, and other removable storage units **1222** and interfaces **1220** which allow software and data to be transferred from the removable storage unit **1222** to computer system **1200**.

Computer system **1200** may also include a communications interface **1224**. Communications interface **1224** allows software and data to be transferred between computer system **1200** and external devices. Communications interface **1224** may include a modem, a network interface (such as an Ethernet card), a communications port, a PCMCIA slot and card, or the like. Software and data transferred via communications interface **1224** may be in electronic, electromagnetic, optical, or other forms capable of being received by communications interface **1224**. This data may be provided to communications interface **1224** via a communications path **1226**. Communications path **1226** carries the data and may be implemented using wire or cable, fiber optics, a phone line, a cellular phone link, an RF link or other communications channels.

In this document, the terms “computer program medium” and “computer readable medium” are used to generally refer to media such as removable storage unit **1218**, removable storage unit **1222**, and a hard disk installed in hard disk drive **1212**. Computer program medium and computer readable medium may also refer to memories, such as main memory **1208** and secondary memory **1210**, which may be memory semiconductors (e.g., DRAMs, etc.).

Computer programs (also called computer control logic) may be stored in main memory **1208** and/or secondary memory **1210**. Computer programs may also be received via communications interface **1224**. Such computer programs, when executed, enable computer system **1200** to implement embodiments as discussed herein. In particular, the computer programs, when executed, enable processor device **1204** to implement the processes disclosed, such as the stages in the method illustrated by flowchart **1100** of FIG. **11** discussed above. Accordingly, such computer programs represent controllers of the computer system **1200**.

Embodiments also may be directed to computer program products comprising software stored on any computer readable medium. Such software, when executed in one or more data processing devices, causes a data processing device(s) to operate as described herein. Embodiments can employ any computer useable or readable medium. Examples of computer readable media include, but are not limited to, primary storage devices (e.g., any type of random access memory), and secondary storage devices (e.g., hard drives, floppy disks, CD ROMs, ZIP disks, tapes, magnetic storage devices, and optical storage devices, MEMS, nanotechnological storage device, etc.).

CONCLUSION

Embodiments described herein relate to remotely activating a combination of mobile device functions using a network

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application. The summary and abstract sections may set forth one or more but not all exemplary embodiments as contemplated by the inventors, and thus, are not intended to limit the present disclosure and the claims in any way.

The embodiments herein have been described above with the aid of functional building blocks illustrating the implementation of specified functions and relationships thereof. The boundaries of these functional building blocks have been arbitrarily defined herein for the convenience of the description. Alternate boundaries may be defined so long as the specified functions and relationships thereof are appropriately performed.

The foregoing description of the specific embodiments will so fully reveal the general nature of the disclosure that others may, by applying knowledge within the skill of the art, readily modify and/or adapt for various applications such specific embodiments, without undue experimentation, without departing from the general concept of the present disclosure. Therefore, such adaptations and modifications are intended to be within the meaning and range of equivalents of the disclosed embodiments, based on the teaching and guidance presented herein. It is to be understood that the phraseology or terminology herein is for the purpose of description and not of limitation, such that the terminology or phraseology of the present specification is to be interpreted by the skilled artisan in light of the teachings and guidance.

The breadth and scope of the present disclosure should not be limited by any of the above-described exemplary embodiments, but should be defined only in accordance with the claims and their equivalents.

What is claimed is:

1. A method of identifying a location of a mobile device using visual characteristics, comprising:

receiving, by a server, a client command to identify the location of the mobile device;

sending, by the server, an instruction to activate a camera to capture a visual representation of an environment surrounding the mobile device;

receiving, at the server, the captured visual representation; determining, by a scene analyzer executed by the server, location characteristics from the captured visual representation;

identifying, by the server, based on the location characteristics from the captured visual representation, the location of the mobile device, wherein the identifying includes utilizing a search resource to determine a significance of the location characteristics; and

sending the identified location of the mobile device to a client computer.

2. The method of claim **1**, further comprising sending an instruction to activate a usefulness determiner on the mobile device that determines whether the captured visual representation is useful to determining the location of the mobile device, wherein the receiving, at the server, the captured visual representation only occurs when the visual representation is determined to be useful by the usefulness determiner.

3. The method of claim **1**, further comprising sending an instruction to activate a camera flash as the camera captures the visual representation of the surrounding environment.

4. The method of claim **3**, further comprising sending an instruction to activate a camera flash usefulness determiner to determine whether the camera flash will improve the quality of the visual representation, wherein the camera flash is only activated when the camera flash usefulness determiner determines that the camera flash is likely to improve the quality of the visual representation.

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5. The method of claim 1, wherein sending an instruction to activate a camera to capture a visual representation of an environment surrounding the mobile device comprises sending an instruction to activate the camera to capture a video of the surrounding environment.

6. The method of claim 1, wherein the identifying, by the server, the location of the mobile device, wherein the identifying includes utilizing a search resource to determine a significance of the location characteristics comprises:

generating a query based on the captured visual representation;

submitting the query to a search engine; and

receiving results from the search engine, wherein identifying the location of the mobile device is based on the results.

7. A system for remotely identifying a location of a mobile device using visual characteristics, comprising:

a computer server;

a remote combination controller on the computer server configured to:

send an instruction to activate a camera to capture a visual representation of an environment surrounding the mobile device,

receive the captured visual representation;

a scene analyzer configured to analyze the received visual representation and identify location characteristics; and

a query generator configured to generate a query based on the analysis by the scene analyzer, wherein the remote combination controller is further configured to submit the generated query to a search engine and receive

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results from the search engine, wherein an estimate of the mobile device location based on the received results is sent to the client computer using the network application.

8. A non-transitory computer readable storage medium having computer-executable instructions stored thereon that, when executed by a computing device, cause the computing device to perform a method of identifying a location of a mobile device using visual characteristics, the method comprising:

receiving, by the computing device, a client command from a client computer to identify the location of the mobile device using visual characteristics;

sending an instruction to activate a camera to capture a visual representation of an environment surrounding the mobile device;

receiving, at the computing device, the captured visual representation;

determining, by a scene analyzer executed by the computing device, location characteristics from the captured visual representation;

identifying, by the computing device, based on the location characteristics from the captured visual representation, the location of the mobile device, wherein the identifying includes utilizing a search resource to determine a significance of the location characteristics; and

sending the identified location of the mobile device to the client computer.

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